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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,020	04/08/2004	Kon-Tsu Kin	KINK3006/EM	7561

23364 7590 02/27/2007

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EXAMINER	
MENDEZ, ZULMARIAM	
ART UNIT	PAPER NUMBER
1709	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/820,020	KIN ET AL.	
	Examiner	Art Unit	
	Zulmariam Mendez	1709	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-8 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1, 2, 3, 4, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halldorson et al. (US 6,358,398) in view of Pollock (US 6,733,662).

Regarding claim 1, Halldorson teaches a wastewater treatment apparatus to perform electro coagulation and advanced oxidation processes comprising: a sealed tank/reactor (190), having a metal body, or a metallic material mounted on an inner wall thereof, for use as a cathode (198, 200); a sacrificial electrode used as an anode (202) which is disposed in the tank and non-electrically connected to the cathode (anode includes a non conductive mesh or screen member (206)); an intake tube (192) for introducing influent water into the button of the tank; an outlet tube (196) for venting processed water from a top of the tank; and a direct current supply (60) having a

positive electrode electrically connected to the anode and a negative electrode electrically connected to the cathode.

However, Halldorson fails to teach an air input for introducing air or oxygen-containing gas into the tank, a mixing device disposed in the bottom of the tank for enabling mixing of the influent water and a gas-liquid separator which is in fluid communication with the tank at the top of the tank for expelling a gas from the tank without water expelling.

Pollock teaches methods and an apparatus for biological treatment of wastewaters where the wastewater is driven through the circulating system by injection of an oxygen containing gas, usually air, near the bottom of the reactor in order to drive the wastewater through the circulating system (col. 4 lines 36-40), and also to enhance the turbulence and small bubble forming capacity within the mixing zone (18) situated below the reactor (80) for enabling mixing of the wastewater, and a gas-liquid separator at the top of the reactor where the gas bubbles disengage from the liquid phase (col. 3 lines 56-59).

Therefore, one of ordinary skill in the art would have been motivated to combine the air injection at the bottom of the reactor of Pollock, in order to drive the wastewater through the system and also to enhance the turbulence and small bubble forming capacity within the mixing zone situated below the reactor for enabling mixing of the wastewater, and the gas-liquid separator at the top of the reactor of Pollock, where the gas bubbles disengage from the liquid phase, with the reactor of Halldorson in order to perform advanced oxidation and electro coagulation simultaneously in the reactor.

Regarding claim 2, the reactor of Halldorson comprises an oxidant supply device (18) mounted on the intake tube (192).

Regarding claim 3, Halldorson teaches a wastewater treatment apparatus where the oxidant supply device (18) includes a venturi (16) in fluid communication with the intake tube for introducing influent water into the bottom of the tank.

Regarding claim 4, the sacrificial electrode as taught by Halldorson is made of stainless steel (col. 16 lines 27-29).

Regarding claim 6, the reactor of Halldorson is made of stainless steel (col. 16 lines 2-6)

Regarding claim 7, Pollock fails to teach that the mixing device comprises a spiral board, a packing material or a perforated dish. However, Halldorson teaches a device to maintain the performance of the overall cell having perforated dishes mounted upon an auger profile rod, as shown in figure 21, for further enhancement of the oxidation/flocking process, to transport fluid within the cell and assist in the countercurrent interaction of dissolved gas and aqueous solution.

Therefore, it would have been obvious to one of ordinary skill in the art to use the device of Halldorson for the mixing zone of Pollock having perforated dishes mounted upon an auger profile rod for further enhancement of the oxidation/flocking process, to transport fluid within the cell and assist in the interaction of the dissolved gas and the aqueous solution.

4. Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halldorson and Pollock as applied above to claim 1, and further in view of Serikawa et al. (US 6,348,143).

Regarding claim 5, Halldorson fails to teach that the sacrificial electrode is made of iron. However, Serikawa teaches a sacrificial electrode serving as an anode, which preferably has a surface having ferrite because of the excellent corrosion resistance and insolubility when used as an anode (col. 10 lines 39-41 & 45-51). Furthermore, it is well known in the art that ferrite is a material science term for iron, or a solid solution having iron as its main constituent. Therefore, it would have been obvious to replace the sacrificial electrode of Halldorson with the ferrite electrode, used as an anode, of Serikawa since it has an excellent corrosion resistance and insolubility when used as such.

Regarding claim 8, Pollock fails to teach that the gas-liquid separator further comprising a gas-liquid separating valve. However, it is well known in the art to provide a valve in order to control the level of an aqueous solution within a system. For example, Serikawa discloses a gas-liquid separator having a valve (109) to release gas to the atmosphere and in order to control the level of the aqueous solution in the separator. Therefore, it would have been obvious to one of ordinary skill in the art to provide the gas-liquid separator in Pollock where the excess gas can be released through a valve as disclosed by Seriwaka in order to control the level of the aqueous solution in the system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zulmariam Mendez whose telephone number is 571-272-9805. The examiner can normally be reached on Monday-Friday, 7:30am-5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-9827. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ZM 3/31

ALEXA D. NECKEL
SUPERVISORY PATENT EXAMINER